

Provider Information: Influenza VISs

Thirteen influenza vaccine products are approved for use in the United States for the 2014-15 influenza season:

Name	Manufacturer	Age Range	# of Strains
Afluria	bioCSL	9 years and older*	Trivalent
Fluarix	GSK	3 years and older	Trivalent
			Quadrivalent
Flublok	Protein Sciences	18 years and older	Trivalent
Flucelvax	Novartis	18 years and older	Trivalent
FluLaval	GSK	3 years and older	Trivalent
			Quadrivalent
FluMist	Medimmune	2 – 49 years	Quadrivalent
Fluvirin	Novartis	4 years and older	Trivalent
Fluzone	Sanofi Pasteur	6 months and older	Trivalent
			Quadrivalent
Fluzone High-Dose	Sanofi Pasteur	65 years and older	Trivalent
Fluzone Intradermal	Sanofi Pasteur	18 – 64 years	Trivalent

*Afluria is licensed for ages 5 and older, but ACIP recommends that it not be used in children 5 through 8 years of age because of increased reports of febrile reactions in this age group. If no other age-appropriate, inactivated influenza vaccine is available for a child 5 through 8 years of age who has a medical condition that increases the risk for influenza complications, Afluria can be used. However, providers should first discuss the benefits and risks of vaccination with Afluria with the child's parent or caregiver. Afluria may be used in persons 9 years of age and older.

Influenza Virus Strains in the 2014-2015 Vaccines

Trivalent formulations will contain these strains:

- A/California/7/2009 (H1N1)-like
- A/Texas/50/2012 (H3N2)-like
- B/Massachusetts/2/2012-like (Yamagata lineage)

Quadrivalent formulations will also include:

- B/Brisbane/60/2008-like (Victoria lineage)

These are the same strains as those in the 2013-14 vaccines.

Abbreviations used for influenza vaccines

IIV: Inactivated Influenza Vaccine (Afluria, Fluarix, FluLaval, Fluvirin, Fluzone)
(IIV3 = Trivalent IIV; IIV4 = Quadrivalent IIV)

LAIV4 (Quadrivalent): Live, Attenuated Influenza Vaccine (FluMist)

RIV3: Recombinant Influenza Vaccine, Trivalent (Flublok)

ccIIV3: Cell Culture Inactivated Influenza Vaccine, Trivalent (Flucelvax)

[Note: For simplicity's sake, IIV3, IIV4, RIV3 and ccIIV3 will be referred to collectively as IIV in this document.]

Concurrent Administration

Influenza vaccines may be administered concurrently with other live or inactivated vaccines.

New for 2014-15: LAIV Preferred for Healthy Children 2 through 8 Years of Age

- If you have LAIV on hand, CDC recommends that it be used for healthy children 2 through 8 years of age who have no contraindications or precautions.

This recommendation is based on several studies that have demonstrated superior efficacy of LAIV in children.

- If LAIV is *not* immediately available, IIV should be used. Vaccination should not be delayed in order to get LAIV. Both LAIV and IIV are safe and effective.

People at Highest Risk for Influenza Complications & Their Close Contacts

Influenza vaccination is recommended for everyone 6 months of age and older. However, it is most important for people at risk for complications from influenza infection, and for people who care for them. In the event of limited vaccine supply, vaccination efforts should focus on vaccinating these groups:

People at Highest Risk for Influenza Complications

- all children 6 through 59 months of age,
- all persons 50 years of age and older,
- anyone with chronic pulmonary (including asthma) or cardiovascular (except isolated hypertension), renal, hepatic, neurological, hematologic, or metabolic disorders (including diabetes mellitus),
- persons who have immunosuppression, including immunosuppression caused by medications or HIV infection,
- women who are or will be pregnant during the influenza season,
- children and adolescents (6 months through 18 years) who are receiving long-term aspirin therapy and who might be at risk for experiencing Reye's syndrome after influenza virus infection,
- residents of nursing homes and other long-term care facilities,
- American Indians and Alaska Natives,
- persons who are morbidly obese (BMI ≥ 40).

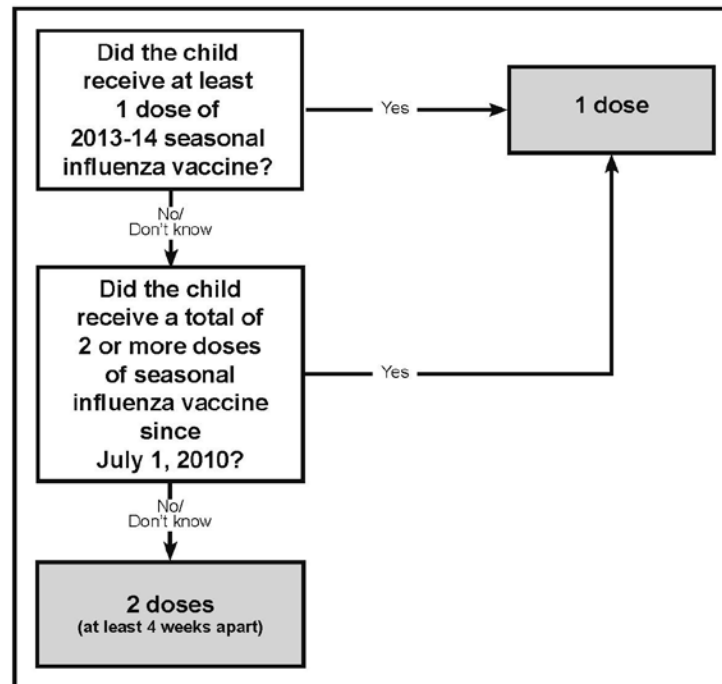
People who Live With or Care for Those at Highest Risk

- healthcare personnel,
- household contacts (including children) and caregivers of children younger than 5 years (i.e., prior to the 5th birthday) and adults 50 years of age and older – particular emphasis on vaccinating contacts of children younger than 6 months,
- household contacts (including children) and caregivers of persons with medical conditions that put them at higher risk for severe complications from influenza (see above).

Vaccinating Children 6 Months through 8 Years of Age

Children 6 months through 8 years of age should receive two doses of influenza vaccine the first year they are vaccinated. Some children in this age group who have been vaccinated previously will also need two doses.

Use either this algorithm or the alternative approach below* to determine whether a patient 6 months through 8 years of age should get 1 or 2 doses this season. Both are acceptable.



*As an **alternative**, you may use the following approach for children whose vaccination history before July 1, 2010 is known:

Administer **1 dose** of flu vaccine during the 2014-15 influenza season to a child 6 months through 8 years of age who received:

- At least 1 dose of 2013-14 influenza vaccine,

OR

- 2 or more doses of seasonal influenza vaccine since July 1, 2010,

OR

- 2 or more doses of seasonal influenza vaccine before July 1, 2010 **and** 1 or more doses of monovalent 2009(H1N1) vaccine,

OR

- 1 or more doses of seasonal influenza vaccine before July 1, 2010 **and** 1 or more doses of seasonal influenza vaccine since July 1, 2010.

A child in this age group who **does not meet any of these conditions** should receive **2 doses** in 2014-15, at least 4 weeks apart.

Contraindications and Precautions

Conditions that are Contraindications or Precautions for Both IIV and LAIV

- **Guillain Barré Syndrome (GBS)**

As a **precaution**, persons who are not at high risk for severe influenza complications and who are known to have experienced GBS within 6 weeks of an influenza vaccine generally should not be vaccinated. As an alternative, physicians might consider using influenza antiviral chemoprophylaxis for these persons. The benefits of influenza vaccination might outweigh the risks for many persons who have a history of GBS and who also are at high risk for severe complications from influenza.

The number of new cases of GBS among the general population is low. But, people with a history of GBS have a much higher chance of experiencing GBS than people with no history of the disease. It isn't known whether the flu vaccine itself might increase the risk of GBS returning in people who have had GBS in the past.

- **Acute Illness**

“The presence of a **moderate or severe acute illness** with or without a fever is a precaution to administration of all vaccines.” (ACIP General Recommendations on Immunization, p. 11) The definition of “moderate or severe acute illness” is left to the clinical judgment of the provider. A vaccination deferred because of an acute illness should be rescheduled after the illness has resolved.

- **Severe Allergy to Vaccine Component / Allergic Reaction after Previous Dose**

A history of a **severe allergic reaction** (e.g., anaphylaxis) after a previous dose of any influenza vaccine, or to any component of the vaccine being given is a **contraindication** for that vaccine.

If a patient reports a severe allergy to any substance, it may be cross-checked against the contents listed on the manufacturer's package insert, or on the following table.

*(NOTE: Some patients have expressed a concern that **any** antibiotic allergy can be a reason to avoid influenza vaccination. Patients should be reassured that only a rare life-threatening allergy to a substance is cause for concern, and that the vast majority of allergies, including allergies to antibiotics, are too mild to cause a vaccine to be withheld. Some influenza vaccines contain gentamycin, neomycin, and/or polymyxin, but many influenza vaccines do not contain any antibiotic. See table below.)*

Substances shown on this table include those removed following production, for which only a trace remains. If in doubt, check the package insert accompanying the vaccine you are using.

Patients are unlikely to be aware of allergies to many of these substances. They are more likely to know if they are allergic to:

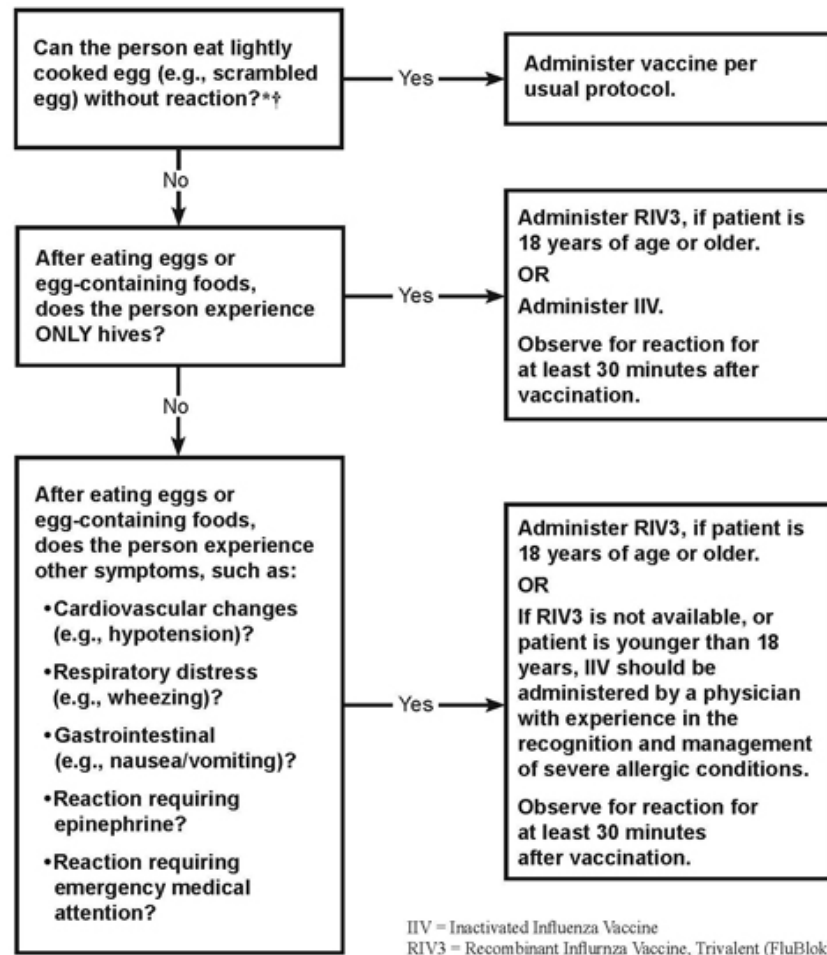
- **Eggs.** All influenza vaccines, with the exception of FluBlok, contain egg protein. See the following section for special instructions for vaccinating egg-allergic patients.
- **Antibiotics, gelatin or latex.** Because these are more commonly recognized allergies, they are highlighted on this table for your convenience.

Vaccine	Contents	Latex?	From Manufacturer's P.I. Dated
Afluria	beta-propiolactone, thimerosal (multi-dose vials only), monobasic sodium phosphate, dibasic sodium phosphate, monobasic potassium phosphate, potassium chloride, calcium chloride, sodium taurodeoxycholate, neomycin sulfate , polymyxin B , ovalbumin, sodium chloride	No	August 2014
Fluarix	octoxynol-10 (Triton X-100), α -tocopheryl hydrogen succinate, polysorbate 80 (Tween 80), hydrocortisone, gentamicin sulfate , ovalbumin, formaldehyde, sodium deoxycholate, sucrose, phosphate buffer	No	June 2014
Flublok	monobasic sodium phosphate, dibasic sodium phosphate, polysorbate 20, baculovirus and host cell proteins, baculovirus and cellular DNA, Triton X-100, lipids, vitamins, amino acids, mineral salts	No	March 2014
Flucelvax	Madin Darby Canine Kidney (MDCK) cell protein, protein other than hemagglutinin, MDCK cell DNA, polysorbate 80, cetyltrimethylammonium bromide, phosphate buffer, β -propiolactone	Yes (Syringe tip cap)	March 2014
Fluvirin	nonylphenol ethoxylate, thimerosal (multidose vial—trace only in prefilled syringe), polymyxin , neomycin , beta-propiolactone, ovalbumin, phosphate buffer	Yes (Syringe tip cap) No (Vial)	February 2014
Flulaval	thimerosal (multi-dose vial only), formaldehyde, sodium deoxycholate, ovalbumin, phosphate buffer, α -tocopheryl hydrogen succinate, polysorbate 80	No	2014
Fluzone	formaldehyde, octylphenol ethoxylate (Triton X-100), gelatin (standard trivalent formulation only), thimerosal (multi-dose vial only), ovalbumin, phosphate buffers, sucrose	No	2014
FluMist	ethylene diamine tetraacetic acid (EDTA), monosodium glutamate, hydrolyzed porcine gelatin , arginine, sucrose, dibasic potassium phosphate, monobasic potassium phosphate, gentamicin sulfate , ovalbumin	No	July 2014

- **Egg Allergy**

IIV and RIV:

Use the following algorithm when vaccinating a patient with a reported or suspected egg allergy:



*Persons with egg allergy may tolerate egg in baked products (e.g. bread or cake). Tolerance to egg-containing foods does not exclude the possibility of egg allergy.

† For persons who have no known history of exposure to egg, but who are suspected of being egg-allergic on the basis of previously performed allergy testing, consultation with a physician with expertise in the management of allergic conditions should be obtained prior to vaccination. Alternatively, RIV3 may be administered if the recipient is 18 years of age or older.

LAIV:

Because of relative lack of data demonstrating safety of LAIV for persons with egg allergy, anyone with a history of egg allergy should receive IIV or RIV rather than LAIV.

Contraindications and Precautions for LAIV Only

Contraindications:

Do not administer LAIV to the following groups:

- Anyone with contraindications listed in the package insert:
 - Children aged 2 through 17 years who are receiving aspirin or aspirin-containing products.
 - Persons who have experienced severe allergic reactions to the vaccine or any of its components, or to a previous dose of any influenza vaccine.
- Pregnant women.
- Immunosuppressed persons.
- Persons with a history of egg allergy.
- Children aged 2 through 4 years who have asthma or who have had a wheezing episode noted in the medical record within the past 12 months, or for whom parents report that a health care provider stated that they had wheezing or asthma within the last 12 months.
- Persons who have taken influenza antiviral medications within the previous 48 hours. (*See above for details.*)

Precautions

- Persons of any age with **asthma** might be at increased risk for wheezing after administration of LAIV. The safety of LAIV in persons with other underlying medical conditions that might predispose them to complications after wild-type influenza infection (e.g., chronic pulmonary, cardiovascular [except isolated hypertension], renal, hepatic, neurologic, hematologic, or metabolic disorders [including diabetes mellitus]) has not been established. These conditions, in addition to asthma in persons 5 years of age and older, should be considered precautions for the use of LAIV.
- A person who has received an **injected live vaccine** (MMR, varicella, zoster, yellow fever) within the past 4 weeks should wait until 4 weeks have elapsed before receiving LAIV, to avoid potential interference between live vaccines.
- Because **antiviral drugs** reduce replication of influenza viruses, LAIV should not be administered until 48 hours after cessation of influenza antiviral therapy. If influenza antiviral medications are administered within 2 weeks after receipt of LAIV, the vaccine dose should be repeated 48 or more hours after the last dose of antiviral medication . . . with any approved vaccine formulation.
- Persons who care for severely immunosuppressed persons who require a protective environment should not receive LAIV, or should avoid contact with such persons for 7 days after receipt, given the theoretical risk for transmission of the live attenuated vaccine virus.

Safety

- **Febrile Seizures**

An increased risk of febrile seizures (<1 per 1,000 children vaccinated) has been observed in children 6 months through 4 years of age who received IIV3. The risk was higher among children who received PCV13 during the same visit. “Taking into consideration benefits and risks of vaccination, **no policy change was recommended for use of IIV or PCV13.**”

No increased risk was observed in children older than 4 years of age after IIV3 or in children of any age after LAIV.

During the 2010-11 flu season, an increased risk of febrile seizures (up to 9 per 1,000 doses) was observed among young children in Australia, associated with a Southern Hemisphere vaccine similar to Afluria. **Because of these findings, ACIP does not recommend Afluria for children younger than 9 years of age.**

- **Deltoid Bursitis**

“Severe shoulder pain and reduced range of motion in the arm where a shot was given” is included on the IIV VIS. This potential adverse event is being added to all updated VISs for injected vaccines, in response to the Institute of Medicine report, *Adverse Effects of Vaccines: Evidence and Causality* (2012), which includes deltoid bursitis among “injection-related adverse events.” A study reporting 13 cases, and three VAERS reports were considered. The report concluded that, “the evidence convincingly supports a causal relationship between the injection of a vaccine and deltoid bursitis.” Note that this adverse event is associated with injection, and not specifically with influenza vaccine. The complete report can be found at http://books.nap.edu/catalog.php?record_id=13164, pages 618-20.

- **Guillain Barré Syndrome (GBS) and IIV**

The 1976 swine flu vaccine was associated with increased frequency of GBS (about 1 additional case per 100,000 persons vaccinated).

Influenza vaccines since then have not been clearly associated with GBS. Worst-case estimates from the few studies that suggest an association between IIV and GBS are low (approximately 1 additional case per million persons vaccinated). GBS has also been noted to occur in relation to influenza illness.

GBS has not been associated with receipt of LAIV.

- **Thimerosal**

Thimerosal, a mercury-containing antibacterial compound, is used in multidose vials of IIV to reduce the likelihood of bacterial growth. LAIV, RIV, and most single-dose vials or syringes of IIV are thimerosal-free. Accumulating evidence shows no increased risks from exposure to thimerosal-containing vaccines. **Persons recommended to receive IIV may receive any age- and risk factor-appropriate vaccine preparation, depending on availability.**

- **Risk of Getting Influenza from the Vaccine**

IIV/RIV

Vaccines that do not contain live influenza virus cannot cause influenza disease.

LAIV

The influenza virus in LAIV is “cold adapted” and “heat sensitive.” That is, it has been engineered to replicate in the relatively lower temperatures of the nasopharynx, but not in the relatively higher temperatures of the lungs. It does not cause influenza disease in recipients.

People vaccinated with LAIV can shed vaccine viruses and, rarely, these viruses can be transmitted to unvaccinated persons. However, serious illnesses have not been reported among unvaccinated persons who have been infected inadvertently with vaccine viruses.

Pregnancy Registries

While IIV is indicated for pregnant women, several manufacturers maintain registries to collect data on pregnancy outcomes and newborn health status from women who receive influenza vaccine while pregnant. Women who receive the following vaccines while pregnant, or their healthcare providers, should be encouraged to contact the appropriate pregnancy registry:

Fluarix (including quadrivalent): 1-888-452-9622

Flublok: 1-888-855-7871

Flulaval (including quadrivalent): 1-888-452-9622

Fluzone Quadrivalent or Fluzone Intradermal: 1-800-822-2463

For more information:

More complete and detailed information can be found in the following publications, from which information in this document is predominantly derived:

- CDC. Prevention and Control of Seasonal Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices (ACIP) – United States, 2014-15 Influenza Season. *MMWR* 2014;63 (No. 32), 691-97. <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6332a3.htm>
- CDC. Prevention and Control of Seasonal Influenza with Vaccines. Recommendations of the Advisory Committee on Immunization Practices – United States, 2013-2014. *MMWR* 2013;62 (No. RR-07). <http://www.cdc.gov/mmwr/pdf/rr/rr6207.pdf>

- CDC. General Recommendations on Immunization – Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR* 2011;60 (No. RR-2). <http://www.cdc.gov/mmwr/pdf/rr/rr6002.pdf>

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